

## CASE REPORT

### DIROFILARIA CAUSING EYE INFECTION IN A PATIENT FROM MALAYSIA

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**Abstract.** Human dirofilariasis caused by *Dirofilaria immitis* and *Dirofilaria repens* have been reported in Malaysia. This is the fourth reported case of dirofilariasis caused by *D. repens*. The patient was a Chinese male from Kuching Sarawak, Malaysia who presented with a one day history of redness and itchiness over the temporal aspect of his left eye. A worm was seen and later removed from beneath the conjunctiva under local anesthesia and based on the morphological characteristics, it was identified as an immature *Dirofilaria repens*.

#### INTRODUCTION

Dirofilariasis is a zoonosis transmitted by mosquitoes from animals to human beings. *Dirofilaria repens* is a natural subcutaneous parasite of dogs in Europe, Africa, Russia, India, Sri Lanka and Vietnam. It occurs in cats but not in dogs in Malaysia. Females measure 13 to 18 cm and males 5 to 7 cm in length. The diameter varies from less than 200 µm in males to more than 400 µm in female worms (Beaver *et al*, 1984). The microfilariae are sheathless and measure 290 to 360 µm by 6 to 8 µm. The microfilaremia is subperiodic nocturnal. The worms reported in tissue sections from humans are easily identified as *D. repens* on the basis of their typical dirofilarial anatomical features

and the presence of longitudinal ridges on the surface of the cuticle. The structure and features of the cuticle offer key morphologic characteristics (Orihel and Eberhard, 1998).

Human infection with *D. repens* was first reported in 1930 by Skrjabin *et al*, who discovered a male worm from a subcutaneous nodule of the right lower eyelid of a woman in the USSR (Beaver *et al*, 1984).

In Sri Lanka, human dirofilariasis due to *Dirofilaria repens* is an occasional zoonotic infection. Seventy cases have been recorded, including 3 expatriates from Russia, England and Korea, who were undoubtedly infected in Sri Lanka. Around 30-60% of dogs are infected with *D. repens* in various parts of the country and the mosquito vectors are *Aedes aegypti*, *Armigeres subalbatus*, *Mansonia uniformis* and *M. annulifera*. Unlike in other countries, the old world infection is most common in children under the age of 9 years, the youngest being 4 months old. The scrotum, penis and perianal regions of male children appear to be frequent sites for the

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worms (Dissanaike *et al*, 1997).

Since then, numerous cases have been reported from Dubai (Mittal *et al*, 2008), Hungary (Pónyai *et al* 2006; Szénási *et al* 2008), Tunisia (Ziadi *et al*, 2005; Fleck *et al*, 2008), France (Abou-Bacar *et al*, 2007; Estran *et al*, 2007), Iran (Negahban *et al*, 2007), Turkey (Beden *et al*, 2007), Russia (Kramer *et al*, 2007) and other parts of Europe.

Human dirofilariasis is a rare infection in Malaysia. The first reported case of dirofilariasis caused by *D. repens* was following the recovery of an adult female from a swelling over the left eyelid in a Malay patient (Mak and Thanalingam, 1984). In 1996 Shekhar *et al* reported two human infections with *D. repens*, one from Melaka and the other from Penang, which were diagnosed histologically from a cervical lymph node and a left inguinal nodule, respectively. Based on the diagnostic criteria for identifying *Dirofilaria* in tissue sections, the parasites were identified as *D. repens* (Shekhar *et al*, 1996). We report here a fourth case of dirofilariasis caused by *D. repens* in Malaysia.

### CASE REPORT

The patient is a 42-year-old Chinese male, from Kuching, Sarawak. He worked as a contractor and his only trip out of Malaysia was to China about 2 to 3 years ago. His hobby is hunting and he likes eating meat from wild game. He has only one dog as pet, he has no cats or other pets.

He was seen on 5 February 2008 with a one day history of redness and itchiness over the temporal aspect of his left eye. His eyes were normal except for congestion of the left temporal bulbar conjunctiva. Slit lamp examination showed a live mobile worm just beneath the conjunctiva. It was removed immediately under local anesthesia. The worm was put in formalin and sent for iden-

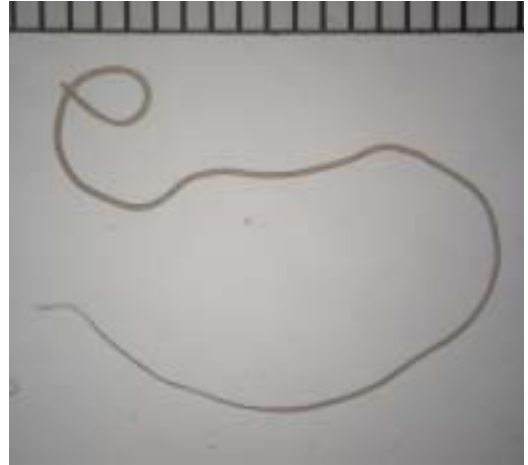


Fig 1–Pale white colored, immature female worm, attenuated at both ends, the anterior end being broader. Scale: 1 division = 1 mm.



Fig 2–Anterior end of female worm. Magnified 400x.

tification to the Department of Parasitology, Faculty of Medicine, University of Malaya. On examination, the specimen was found to be an immature female nematode worm measuring 11.5 cm long, with a maximum width of 400  $\mu$ m (Fig 1). The worm was rounded at both ends, the anterior end being wider than the posterior. The head was rounded with evidence of papillae arranged in two circles (Fig 2). The vulva opening was



Fig 3—Cuticle of worm showing longitudinal ridges and circular annulations. Magnified 400x.

2,400  $\mu\text{m}$  from the anterior end. The width of the vulva opening was 260  $\mu\text{m}$ . The tail length was 110  $\mu\text{m}$  and the width at the anus was 120  $\mu\text{m}$ . The cuticle had longitudinal ridges and circular annulations (Fig 3). Based on the morphological characteristics, the worm was identified as an immature *D. repens*.

Physical examination showed no skin rash. Examination of both eyes showed a normal retina and vitreous fluid bilaterally. His vision was 6/6 in both eyes. There were no other positive findings except for the laboratory test which showed that he was hepatitis B positive.

## DISCUSSION

Zoonotic filarial infections in humans are not commonly reported in Malaysia. The reason is they are not recognized or reported. Symptoms are mild and may go unrecognized and untreated unless worms migrate to highly sensitive tissues, such as the eye. The unavailability of reliable serologic assays has precluded epidemiologic serosurveys that would help ascertain the

true prevalence of these infections.

Environmental conditions relating to parasite vectors and human activity are important in the epidemiology of these infections. Infections appear to be more common in areas with long mosquito breeding seasons and where people spend a lot of time outdoors in conjunction with work or recreational activities. Many people are exposed and many more are infected than are recognized. It is likely that in most of these infections, the larvae die or are killed quickly. Whether they die naturally or are destroyed by the host is not known. The species of intact worms is more easily identified because of the number of morphologic features that can be evaluated (Orihel and Eberhard, 1998).

The zoonotic filariae, *D. immitis* and *D. repens*, have become increasingly recognized worldwide as inadvertent human pathogens. Human infection may present as either subcutaneous nodules or lung parenchymal disease, which may be asymptomatic. The significance of infection in humans is that pulmonary lesions and some subcutaneous lesions are commonly labeled malignant tumors, requiring invasive investigation and surgery before a correct diagnosis is made. The pathology of the condition is associated with aberrant localization of immature worms that fail to reach adulthood, therefore, microfilariae almost always absent.

The usual definitive host of *D. immitis* and *D. repens* is the domestic dog, although cats, wolves, coyotes, foxes, muskrats, and sea lions may act as hosts and reservoirs of filarial worms. Mosquitoes of the genera *Aedes*, *Anopheles*, and *Culex* may all act as intermediate hosts or vectors. Some species of fleas, lice, and ticks also may act as vectors. In Malaysia, zoonotic filarial infections reported are *D. immitis*, *D. repens*, *Brugia pahangi* and *B. malayi* (subperiodic form).

Mak *et al* (1980) reported that 20.6% of cats and 57.4% of dogs in Peninsular Malaysia had filarial infections.

In dogs, adult *D. immitis* resides in the right ventricle of the heart and pulmonary arteries. Female worms produce and release thousands of microfilariae larvae into the circulation daily. Some microfilariae have a unique circadian periodicity in the peripheral circulation over a 24-hour period. The arthropod vectors, mosquitoes and flies, also have a circadian rhythm when they obtain blood meals. The highest concentration of microfilariae usually occurs when the local vector is feeding most actively. Microfilariae undergo developmental changes in the insect and develop into infective larvae over the next 10-16 days depending on environmental conditions. For the final stage of development, third-stage larvae are inoculated into the vertebral host during the act of feeding. These larvae reside and mature in the subcutaneous tissues and along muscle sheaths for the next several months before migrating to the heart, where the nematode matures over 6-7 months. Adult worms are 1-2 mm in diameter, with females being 25-30 cm in length and males generally being shorter. The adults of *D. repens*, in contrast, reside in the subcutaneous tissues of dogs and cats, although the life cycle and release of microfilaria in the peripheral circulation remain the same as for *D. immitis*.

Humans are accidental and dead-end hosts of dirofilariae because adult worms do not reach maturity in the heart or skin. Most infective larvae injected into humans are thought to perish, therefore, infected individuals usually are not microfilaremic. Only a degenerated immature (fourth-stage) larva or adult worms (fifth-stage larva) are isolated from ectopic positions in the body.

Zoonotic filarial infections continue to occur so clinicians, pathologists and parasitologists must be alert to the possibility of these infections.

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